POSITIVE ELECTRODE ACTIVE MATERIALS FOR SECONDARY BATTERIES AND METHODS OF PREPARING SAME

Abstract of the Disclosure

The present invention is a positive electrode active material that can be used in secondary lithium and lithium-ion batteries to provide the power capability, i.e., the ability to deliver or retake energy in short periods of time, desired for large power applications such as power tools, electric bikes and hybrid electric vehicles. The positive electrode active material of the invention includes at least one electron conducting compound of the formula $LiM^1_{x-y}\{A\}_yO_z$ and at least one electron insulating and lithium ion conducting lithium metal oxide, wherein M^1 is a transition metal, {A} is represented by the formula Σw_iB_i wherein B_i is an element other than M^1 used to replace the transition metal M^1 and w_i is the fractional amount of element B_i in the total dopant combination such that $\Sigma w_i = 1$; B_i is a cation in $LiM^1_{x-y}\{A\}_yO_z$; $0.95 \leq x \leq 2.10$; $0 \leq y \leq x/2$; and $1.90 \leq z \leq 4.20$. Preferably, the lithium metal oxide is $LiAlO_2$ or $Li_2M^2O_3$ wherein M^2 is at least one tetravalent metal selected from the group consisting of Ti, Zr, Sn, Mn, Mo, Si, Ge, Hf, Ru and Te. The present invention also includes methods of making this positive electrode active material.